MAZHARUL ULOOM COLLEGE
(AUTONOMOUS)

(Established & Managed by the Ambur Muslim Educational Society)
Accredited by NAAC with Grade 'A" CGPA 3.23 in Cycle 3
Affiliated to Thiruvalluvar University, Vellore
Ambur 635802 (Tirupattur District)

Department of Mathematics

STRIVER SECURES SUCCESS
முயன்றவன் வெல்வான்

COURSE STRUCTURE & SYLLABUS

for the programme

B. Sc (Mathematics)

(Students admitted from year 2025-2026 onwards)

Introduction

B.Sc (Mathematics)

Mathematics is the study of quantity, structure, space and change, focusing on problem solving, with wider scope of application in science, engineering, technology, social sciences etc. The key core areas of study in Mathematics include Algebra, Analysis (Real & Complex), Differential Equations, Geometry, and Mechanics. The bachelor's degree B.Sc. Mathematics is awarded to the students on the basis of knowledge, understanding, skills, attitudes, values and academic achievements expected to be acquired by learners at the end of the Programme. Learning outcomes of Mathematics are aimed at facilitating the learners to acquire these attributes, keeping in view of their preferences and aspirations for gaining knowledge of Mathematics.

Bachelor's degree in mathematics is the culmination of in-depth knowledge of algebra, calculus, geometry, differential equations and several other branches of Mathematics. This also leads to study of related areas like Computer science, Financial Mathematics, Statistics and many more. Thus, this programme helps learners in building a solid foundation for higher studies in Mathematics. The skills and knowledge gained have intrinsic aesthetics leading to proficiency in analytical reasoning. This can be utilized in Mathematical modelling and solving real life problems.

Students completing this programme will be able to present Mathematics clearly and precisely, make abstract ideas precise by formulating them in the language of Mathematics, describe Mathematical ideas from multiple perspectives and explain fundamental concepts of Mathematics to non-Mathematicians.

Completion of this programme will also enable the learners to join teaching profession, enhance their employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

Program Outcomes (POs)	
PO Code	**Program Outcome Statement**
PO1	**Disciplinary Knowledge:** Acquire detailed knowledge and expertise in all the disciplines of the subject.
PO2	**Communication Skills:** Ability to express thoughts and ideas effectively in writing, listening and confidently communicate with others using appropriate media.
PO3	**Critical Thinking:** Students will develop aptitude, Integrate skills of analysis, critiquing, application and creativity.
PO4	**Analytical Reasoning:** Familiarize to evaluate the reliability and relevance of evidence, collect, analyze and interpret data.
PO5	**Problem Solving:** Capacity to extrapolate the learned competencies to solve different kinds of non-familiar problems.
PO6	**Information/digital literacy:** Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.
PO7	**Lifelong Learning:** Engage in lifelong learning and work on career enhancement and adapt to changing personal, professional and societal needs.

Program Specific Outcomes (POs)	
PSO Code	**Program Specific Outcome Statement**
PSO1	Gain strong knowledge of mathematical and statistical concepts to analyse and solve theoretical and practical problems.
PSO2	Develop skills to understand, build, and present logical mathematical arguments and apply quantitative reasoning in various fields.
PSO3	Respect diverse ideas and nurture critical thinking, problem-solving, decision-making, and leadership for innovation and entrepreneurship.
PSO4	Adapt to emerging trends by gaining skills in data science, artificial intelligence, and machine learning.
PSO5	Build analytical, computational, and communication skills to enhance employability, pursue higher studies, and contribute to society.

Level	Definition	Key Actions
K1: Remembering	Ability to recall or recognize facts, terms, basic concepts, or answers without necessarily understanding them.	Retrieve, Memorize, Repeat, Define, Identify, Recognize
K2 : Understanding	Comprehending the meaning of information, interpreting or translating knowledge into your own words.	Explain, Describe, Summarize, Interpret, Paraphrase
K3: Applying	Using knowledge in new situations, such as solving problems or applying theories to real-world situations.	Use, Demonstrate, Implement, Calculate, Practice
K4: Analyzing	Breaking information into parts to explore understandings and relationships; identifying motives or causes.	Compare, Contrast, Categorize, Distinguish, Examine, Organize
K5: Evaluating	Making judgments based on criteria and standards, often involving checking and critiquing.	Judge, Critique, Justify, Assess, Prioritize, Recommend
K6: Creating	Putting elements together to form a new coherent whole or original product.	Design, Develop, Invent, Compose, Construct, Generate

Department of Mathematics

SYLLABUS AND SCHEME OF EXAMINATIONS – I &II SEMESTER

The course comprises of

(i)	Foundation Course	: Part-I	: Tamil / Urdu
		: Part-II	: English
(ii)	Core Courses	: Part-III	: Main Subjects / Allied Subjects Electives
(iii)	Skill Enhancement Courses	: Part-IV	: Skill Development Courses
(iv)	Extension Services	: Part-V	: All students have to study Value Education / Moral Instruction, Environmental Studies and enroll for NSS, NCC, SPORTS, YRC, or any other service organizations in the college.

Sem	Course Code	Part	Course Category	Course Title	Ins. Hrs/ Week	Credit	Marks		Total
							CIA	ESE	
Semester I	URDU - 25BLU10 / TAMIL - 25BLT10	I	Language – I	Language – I	6	3	25	75	100
	25BLE10	II	English - I	English - I	6	3	25	75	100
	25BMA11	III	Core - I	Algebra and Trigonometry	5	5	25	75	100
	25BMA12		Core - II	Differential Calculus	5	5	25	75	100
	25BEMA13A		Elective – I	Numerical Methods -I	4	3	25	75	100
	25BEMA13B			Financial Mathematics					
	25BSMA14	IV	Skill Enhancement Course – I (SEC - I)	Mathematics for Competitive Examinations – I	2	2	25	75	100
	25BFMA15		Foundation Course	Bridge Mathematics	2	2	25	75	100
	Total				**30**	**23**			**700**
Semester II	URDU - 25BLU20 / TAMIL - 25BLT20	I	Language – II	Language-II	6	3	25	75	100
	25BLE20	II	English – II	English-II	6	3	25	75	100
	25BMA21	III	Core – III	Integral Calculus	5	5	25	75	100
	25BMA22		Core – IV	Analytical Geometry (2D & 3D)	5	5	25	75	100
	25BEMA23A		Elective – II	Numerical Methods -II	4	3	25	75	100
	25BEMA23B			Industrial Mathematics					
	25BSMA24	IV	Skill Enhancement Course – II (SEC - II)	Mathematics for Competitive Examinations – II	2	2	25	75	100
	25BSMA25		Skill Enhancement Course – III (SEC - III)	Office Automation	2	2	25	75	100
	Total				**30**	**23**			**700**

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	25BMA11	Core – I	5	5	25	75	100
Course Title	**Algebra and Trigonometry**						

Learning Objectives	
LO1	To understand the relation between roots and coefficients, solve reciprocal equations, and apply Horner's method for finding polynomial roots.
LO2	To learn the concepts of Binomial, Exponential, and Logarithmic series and apply them for approximations.
LO3	To find eigenvalues and eigenvectors, verify Cayley-Hamilton theorem, compute matrix powers and inverses, and diagonalise matrices.
LO4	To expand trigonometric functions like sin nθ, cos nθ, tan nθ, and express them in powers of θ.
LO5	To understand hyperbolic functions, their inverse, logarithms of complex numbers, and summation of trigonometric series using C+iS method.

SYLLABUS

Unit	Contents	Hours
I	**Unit I: Theory of Equations** Relation Between Roots and Coefficients – Symmetric functions of roots - Increasing and decreasing the roots of a given equation-Removal of terms - Reciprocal Equations - Standard form – solutions of roots of polynomials by Horner's method–related problems. (Chapter 7: Sections 1 to 3, 5, 6, 9 and 13).	**15**
II	**Unit II: Summation of Series and Approximations** Binomial–Exponential–Logarithmic Series (Theorems without proof)–Approximations-related problems. (Chapter 2,3,4 Full).	**15**
III	**Unit III: Matrices** Characteristic equation –Eigen values and Eigen Vectors - Cayley –Hamilton Theorem (Statement only) – Finding powers of square matrix, Inverse of a square matrix upto order 3, Diagonalization of square matrices-related problems. (Chapter 6, Pages 6.50 to 6.82).	**15**
IV	**Unit IV: Trigonometry** Expansions of $\sin n\theta$, $\cos n\theta$ in powers of $\sin\theta$, $\cos\theta$ -Expansion of $\tan n\theta$ in terms of $\tan\theta$ - Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta\sin^n\theta$-Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in powers of θ-related problems. (Chapter 11: Sections 8.1 to 8.6).	**15**
V	**Unit V: Trigonometry (cont…)** Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complex quantities, Summation of trigonometric series by C+iS method –related problems. (Chapter 11, Pages: 11.31 to 11.74, 11.108 to 11. 123).	**15**

Recommended Textbook(s):

P.R. Vittal and V. Malini - Algebra, Analytical Geometry and Trigonometry – Margham Publications, Chennai

Reference Book(s):

1.W.S.BurnstineandA.W.Panton,Theoryofequations
2.David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007
3.G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005
4.C.V.DurellandA.Robson,AdvancedTrigonometry,Courier Corporation, 2003
5. J. Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012.
6. Calculus and Analytical Geometry, G.B. Thomas and R.L. Finny, Pearson Publication,9th Edition, 2010.

Web Resource(s):

https://nptel.ac.in

Course Outcomes

Upon successful completion of this course, the student will be able to:

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Recall and apply relations between roots and coefficients, solve reciprocal equations, and use Horner's method to find polynomial roots.	K1, K2, K3
CO2	Understand and apply Binomial, Exponential, and Logarithmic series for approximations in problem solving.	K1, K2, K3
CO3	Analyse matrices to find eigenvalues, eigenvectors, verify Cayley-Hamilton theorem, and diagonalise square matrices.	K2, K3, K4
CO4	Apply trigonometric expansions to express functions in powers of θ for problem solving.	K1, K2, K3
CO5	Analyse and evaluate hyperbolic functions, inverse hyperbolic functions, and summation of trigonometric series using the C+iS method.	K2, K3, K4, K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	2	2	3	3	2	1	3	2	1	2	3	**2.25**
CO2	3	2	2	2	3	2	1	3	2	1	2	3	**2.17**
CO3	3	2	3	3	3	3	1	3	3	2	2	3	**2.58**
CO4	3	2	2	2	3	2	1	3	2	1	2	3	**2.17**
CO5	3	2	3	3	3	3	1	3	3	2	2	3	**2.58**
Mean Overall Score													2.35
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	25BMA12	Core – II	5	5	25	75	100
Course Title	**Differential Calculus**						

Learning Objectives	
LO1	To introduce the concept and techniques of successive differentiation and its applications.
LO2	To enable students to understand partial differentiation and Jacobians for functions of multiple variables.
LO3	To teach methods of maxima, minima, and optimization using Euler's theorem and Lagrange's multipliers.
LO4	To provide knowledge on curvature, radius, and centre of curvature in Cartesian and polar forms.
LO5	To develop the ability to find and interpret envelopes of families of curves.

SYLLABUS		
Unit	**Contents**	**Hours**
I	**UNIT-I: Successive Differentiation** The n^{th} derivative – Standard results – Fractional expressions – Trigonometrical transformation–Leibnitz formula for the n^{th} derivative of a product. (Chapter 3: Full, pages 69 to 87).	**15**
II	**UNIT- II: Partial Differentiation** Partial derivatives–Successive - Partial derivatives–Function of a function rule–Total differential coefficient – Implicit Functions- Jacobian of two and three variables and its properties. (Chapter 8: Sections 1.1 to 1.5, pages 178 to 191).	**15**
III	**UNIT-III: Partial Differentiation (Continued)**: Homogeneous functions – Euler's Theorem – Maxima and Minima of functions of two variables-Lagrange's method of undetermined multipliers. (Chapter 8: Sections 1.6 and Sections 3 to 5, pages 221 to 237).	**15**
IV	**UNIT-IV: Curvature** Definition of Curvature–Circle, Radius and Centre of Curvature – Radius of Curvature in Polar Co-ordinates. (Chapter 10:Sections 2.1 to 2.4 and 2.6, pages 291 to 323).	**15**
V	**UNIT-V: Envelope** Method of finding the envelope–Another definition of envelope–Envelope of family of curves which are quadratic in the parameter. (Chapter 10:Sections 1.1 to 1.4, pages 281 to 291).	**15**

Recommended Textbook(s):

S. Narayanan and T, K, Manicavachagom Pillay, Calculus Volume I, Ananda Book Depot (2017)

Reference Book(s):

1. R. Courant and F. John, Introduction to Calculus and Analysis (Volumes I & II), Springer- Verlag, New York, Inc., 1989.
2. T. Apostol, Calculus, Volumes I and II.

3. S. Goldberg, Calculus and mathematical analysis.
4. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.
5. G.B. Thomas and R.L. Finney, Calculus, Pearson Education,2010.
6. M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley(India) P.Ltd.(Pearson Education),Delhi, 2007.
7. P. R. Vittal, Calculus

Web Resource(s):

https://nptel.ac.in

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	**CO Statement**	**Cognitive Level (K-Level)**
CO1	Recall and compute nth derivatives using standard results and Leibnitz formula.	K1, K2, K3
CO2	Understand and apply concepts of partial differentiation, total differential coefficients, and Jacobians.	K1, K2, K3
CO3	Apply Euler's theorem, solve maxima-minima problems, and use Lagrange's method for optimization.	K2, K3, K4
CO4	Analyse and determine curvature, radius, and centre of curvature in Cartesian and polar coordinates.	K2, K3, K4
CO5	Evaluate and construct envelopes of families of curves including quadratic parameters.	K3, K4, K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	2	2	3	3	2	1	3	2	1	2	3	**2.25**
CO2	3	2	3	3	3	2	1	3	3	2	2	3	**2.5**
CO3	3	2	3	3	3	3	1	3	3	2	2	3	**2.58**
CO4	3	2	3	3	3	3	1	3	3	2	2	3	**2.58**
CO5	3	2	3	3	3	2	1	3	3	2	2	3	**2.5**
Mean Overall Score													2.48
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	25BEMA13A	Elective – I	4	3	25	75	100
Course Title	**Numerical Methods – I**						

Learning Objectives	
LO1	To introduce methods to find numerical solutions of algebraic and transcendental equations.
LO2	To enable students to solve systems of linear equations using direct numerical methods.
LO3	To impart understanding of finite differences and difference operators for discrete data analysis.
LO4	To teach interpolation techniques with equal intervals for estimating values within data sets.
LO5	To develop skills in interpolation using unequal intervals for accurate function approximation.

SYLLABUS		
Unit	**Contents**	**Hours**
I	**Unit I: Solutions of Algebraic and Transcendental Equations** Bisection Method - Iteration Method - Regula-Falsi Method- Newton-Raphson Method. **Chapter1**: Section1.1to1.4	**12**
II	**Unit II: Solutions of Simultaneous Linear Equations** Gauss-Elimination Method - Gauss-Jordan Method - Crout's Method – Method of Decomposition (Factorization Method). **Chapter2**: Section2.1to2.3	**12**
III	**Unit III: Finite Differences** Forward, Backward, Shifting Operators – Central and averaging difference Operators and Relation between them- Differences of Polynomial-Factorial Polynomials. **Chapter3:** Section3.1to3.4	**12**
IV	**Unit IV: Interpolation with Equal Intervals** Newton's Forward and Backward Interpolation formulae - Central Differences Formulae: Gauss-Forward and Backward Formulae- Stirling's Formula and Bessel's Formula. **Chapter4**: Section4.1to4.3(omit4.1a) **Chapter5**: Section5.1to5.6	**12**
V	**Unit V: Interpolation with Unequal Intervals** Divided Differences - Newton's Divided Differences Formula for Interpolation - Lagrange's Formula for Interpolation - Inverse Interpolation - Lagrange's method Reversion of Series method. **Chapter6**: Section6.1,6.2,6.5&6.7	**12**

Recommended Textbook(s):

P. Kandasamy, K. Thilagavathy(2003) Calculus of Finite differences & Numerical Analysis, S. Chand & Company Ltd., New Delhi-55.

Reference Book(s):

1.B.D. Gupta.(2001)*Numerical Analysis.* Konark Pub.Ltd.,Delhi
2. M.K. Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing

Company, Chennai.
3. S. Arumugam. (2003) *Numerical Methods*, New Gamma Publishing, Palayamkottai.
4. H.C.Saxena.(1991)*Finite differences and Numerical analysis,* S.Chand&Co.,Delhi

Web Resource(s):

Https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/
Https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Apply numerical methods like Bisection, Iteration, Regula-Falsi, and Newton-Raphson to solve algebraic and transcendental equations.	K3
CO2	Solve systems of linear equations using Gauss-Elimination, Gauss-Jordan, Crout's, and Factorization methods.	K3
CO3	Understand and compute finite differences, factorial polynomials, and operate using difference operators.	K2, K3
CO4	Apply Newton's forward and backward, Gauss's forward and backward, Stirling's, and Bessel's interpolation formulae for equal interval data.	K3
CO5	Analyse and apply Newton's divided differences, Lagrange's interpolation, and inverse interpolation for unequal interval data.	K3, K4

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	2	3	3	3	3	1	3	3	2	2	3	**2.58**
CO2	3	2	3	3	3	3	1	3	3	2	2	3	**2.58**
CO3	3	2	2	3	3	2	1	3	2	1	2	3	**2.25**
CO4	3	2	3	3	3	2	1	3	3	2	2	3	**2.5**
CO5	3	2	3	3	3	3	1	3	3	2	2	3	**2.58**
Mean Overall Score													2.50
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	25BEMA13B	Elective – I	4	3	25	75	100
Course Title	**Financial Mathematics**						

Learning Objectives	
LO1	Gain an understanding of how interest rates function in financial mathematics, including both simple and compound interest applications.
LO2	Explore the concepts of annuities and develop the ability to compute their present and future values effectively.
LO3	Build competency in handling loan-related calculations, such as determining EMIs and constructing amortization schedules.
LO4	Develop skills to assess the value of various investment options and understand their financial implications.
LO5	Learn to assess investment risk and return, and apply diversification strategies for better portfolio management.

SYLLABUS		
Unit	Contents	Hours
I	**Interest:** Simple interest, compound interest, effective interest rates, present and future value calculations.	12
II	**Annuities:** Understanding annuities (certain and uncertain), present and future values, and sinking funds.	12
III	**Loans and Amortization:** Loan calculations, including equated monthly installments (EMI) and different interest calculation methods.	12
IV	**Investments:** Valuation of stocks and bonds, mutual funds, and other investment instruments.	12
V	**Risk and Return:** Concepts of risk and return, including risk premium and portfolio diversification.	12

Recommended Textbook(s):

An Undergraduate Introduction to Financial Mathematics – by Robert Buchanan

Reference Book(s):

1. An Elementary Introduction to Mathematical Finance – Sheldon Ross
2. Business Mathematics - by Lerner and Zima (Schaum's Outline Series)
3. Corporate Finance by Brealy and Myers
4. Investment by Sharpe and Bailey Upper Saddler River, N.J. Prentice Hall, c1999.
5. Investment Science by Luenberger (Indian Edition), Oxford University Press
6. Investments by Bodie, Kane and Marcus, McGraw-Hill Irwin, c2005.

Web Resource(s):

https://nptel.ac.in

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Calculate simple and compound interest, effective interest rates, and present/future values for financial transactions.	K3
CO2	Determine present and future values of annuities and compute sinking fund requirements.	K3
CO3	Apply techniques to calculate loan repayments and understand amortization schedules.	K3
CO4	Analyse and value different investment instruments including stocks, bonds, and mutual funds.	K4
CO5	Evaluate risk and return concepts and apply portfolio diversification strategies.	K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	2	2	3	3	2	1	3	2	2	2	3	**2.33**
CO2	3	2	3	3	3	2	1	3	3	2	2	3	**2.5**
CO3	3	2	3	3	3	3	1	3	3	2	2	3	**2.58**
CO4	3	3	3	3	3	3	2	3	3	3	2	3	**2.83**
CO5	3	3	3	3	3	3	2	3	3	3	3	3	**2.92**
Mean Overall Score													2.63
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	25BSMA14	Skill Enhancement Course – I (SEC-I)	2	2	25	75	100
Course Title	**Mathematics For Competitive Examinations -I**						

Learning Objectives	
LO1	To build a strong foundation in basic arithmetic operations for problem-solving efficiency.
LO2	To develop the ability to calculate averages, H.C.F., and L.C.M. for quantitative aptitude tests.
LO3	To enhance skills in solving real-life problems involving percentages, profit and loss.
LO4	To equip students with techniques to solve ratio, proportion, and partnership-based questions quickly.
LO5	To train students to approach chain rule and pipes & cisterns problems with logical strategies and accuracy.

SYLLABUS		
Unit	**Contents**	**Hours**
I	**Unit I: Arithmetic Ability** H.C.F. and L.C.M. of Numbers, Average. Section I: 2,6	**06**
II	**Unit II: Arithmetic Ability (Cont…)** Problem on Numbers and Problems on Ages. Section I: 7, 8	**06**
III	**Unit III Arithmetic Ability (Cont…)** Percentage, Profit and Loss Section I: 11, 12	**06**
IV	**Unit IV Arithmetic Ability(Cont...)** Ratio and Proportion, Partnership Section I : 13, 14	**06**
V	**Unit V Arithmetic Ability (Cont…)** Chain Rule, Pipes and Cisterns Section I : 15, 16	**06**

Recommended Textbook(s):
R. S. Aggarwal [2017], Quantitative Aptitude for Competitive Examinations, S. Chand and Company, New Delhi.
Reference Book(s):
Praveen R.V, Quantitative Aptitude and reasoning, PHI Learning Pvt, New Delhi.
Web Resource(s):
https://nptel.ac.in

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Solve problems on H.C.F, L.C.M, and averages with accuracy and speed.	K3
CO2	Apply arithmetic concepts to tackle questions related to numbers and ages effectively.	K3
CO3	Demonstrate problem-solving skills in percentage and profit & loss based scenarios.	K3
CO4	Analyse and solve questions involving ratio, proportion, and partnership systematically.	K4
CO5	Evaluate and implement appropriate methods for chain rule and pipes & cisterns problems.	K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	2	3	3	3	2	1	3	3	2	2	3	**2.50**
CO2	3	2	3	3	3	2	1	3	3	2	2	3	**2.50**
CO3	3	2	3	3	3	2	1	3	3	2	2	3	**2.50**
CO4	3	2	3	3	3	2	1	3	3	2	2	3	**2.50**
CO5	3	2	3	3	3	2	1	3	3	2	2	3	**2.50**
Mean Overall Score													2.50
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	25BFMA15	Foundation Course	2	2	25	75	100
Course Title	**Bridge Mathematics**						

Learning Objectives	
LO1	To strengthen foundational algebraic skills necessary for higher mathematics.
LO2	To develop confidence in solving sequence, series, and counting principle problems.
LO3	To enhance understanding of permutations, combinations, and their real-life applications.
LO4	To build conceptual clarity in trigonometric identities and their transformations.
LO5	To equip students with essential calculus tools for limits, differentiation, and integration.

SYLLABUS		
Unit	Contents	Hours
I	**UNIT-I: Algebra:** Binomial theorem, General term, middle term, problems based on these concepts.	**06**
II	**Unit II:** Sequences and series (Progressions). Fundamental principle of counting. Factorial n.	**06**
III	**Unit III:** Permutations and combinations, Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups.	**06**
IV	**Unit IV: Trigonometry:** Introduction to trigonometric ratios, proof of sin(A+B), cos(A+B), tan(A+B) formulae, multiple and sub multiple angles, sin(2A), cos(2A), tan(2A) etc., transformations sum into product and product into sum formulae, inverse trigonometric functions, sine rule and cosine rule.	**06**
V	**Unit V: Calculus:** Limits, standard formulae and problems, differentiation, first principle, uv rule, u/v rule, methods of differentiation, application of derivatives, integration - product rule and substitution method	**06**

Recommended Textbook(s):
1. NCERT class XI and XII text books. 2. Any State Board Mathematics text books of class XI and XII

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Apply binomial theorem concepts to solve algebraic problems confidently.	K3
CO2	Solve sequence, series, and fundamental counting principle problems with accuracy.	K3
CO3	Analyse and apply permutation and combination techniques in varied contexts.	K4
CO4	Understand and derive trigonometric identities and use them to simplify expressions.	K2
CO5	Evaluate limits, differentiate and integrate functions using standard methods.	K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	2	3	3	3	2	1	3	3	2	2	3	**2.50**
CO2	3	2	3	3	3	2	1	3	3	2	2	3	**2.50**
CO3	3	2	3	3	3	2	1	3	3	2	2	3	**2.50**
CO4	3	2	3	3	3	2	1	3	3	2	2	3	**2.50**
CO5	3	2	3	3	3	2	1	3	3	2	2	3	**2.50**
Mean Overall Score													2.50
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	25BMA21	Core – III	5	5	25	75	100
Course Title	**Integral Calculus**						

Learning Objectives	
LO1	To enable students to integrate complex algebraic and trigonometric expressions systematically.
LO2	To develop the ability to apply properties of definite integrals and reduction formulae in problem solving.
LO3	To impart conceptual understanding of double and triple integrals with applications in geometry.
LO4	To equip students to handle transformations and evaluate integrals in polar coordinates efficiently.
LO5	To familiarize students with Beta and Gamma functions, their properties, and practical applications.

SYLLABUS

Unit	Contents	Hours
I	**UNIT-I: Integrations** Integrals of type**:** $\int \sqrt{ax^2+bx+c}\ dx$, $\int \frac{dx}{\sqrt{ax^2+bx+c}}$, $\int \frac{px+q}{ax^2+bx+c}\ dx$, $\int \frac{px+q}{\sqrt{ax^2+bx+c}}\ dx$, $\int \frac{dx}{(px+q)\sqrt{ax^2+bx+c}}$, $\int \frac{\sqrt{ax+b}}{\sqrt{px+q}} dx$, $\int \frac{dx}{(px+q)\sqrt{ax+b}}$, $\int \frac{dx}{a+b\cos x+c\sin x}$ (Chapter 1:Sections 1 to 8, pages 1 to 66).	**15**
II	**UNIT-II: Integrations (cont…)** Definite Integrals and its properties **-** Reduction formulae -Types, integration of product of powers of algebraic and trigonometric functions, integration of product of powers of algebraic and logarithmic functions- Bernoulli's formula. (Chapter 1:Sections 11 to 15, pages 67 to 104).	**15**
III	**UNIT-III: Multiple Integral** Double Integrals: Definition of double integrals- evaluation of double integrals – double integrals in polar coordinates-Change of order of integration. (Chapter 5:Sections 1 to 3 pages 201 to 219).	**15**
IV	**UNIT-IV: Multiple Integral cont.** Triple integrals: Definition of Triple integrals- evaluation of Triple integrals - Applications of multiple integrals: areas of curved surfaces –volumes of solids of revolution. (Chapter 5: Sections 4 to 7, pages 219 to 250).	**15**
V	**UNIT-V: Beta and Gamma functions** Definitions of Beta and Gamma functions – recurrence formula of Gamma functions – properties of Beta and Gamma functions-relation between Beta and Gamma functions-Applications. (Chapter 7: Sections 2 to 6, pages 278 to 300).	**15**

Recommended Textbook(s):
P.R. Vittal and V. Malini - Algebra, Analytical Geometry and Trigonometry – Margham Publications, Chennai
Reference Book(s):
1.W.S.BurnstineandA.W.Panton,Theoryofequations 2.David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007 3.G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005 4.C.V.DurellandA.Robson,AdvancedTrigonometry,Courier Corporation, 2003 8. J. Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012. 9. Calculus and Analytical Geometry, G.B. Thomas and R.L. Finny, Pearson Publication,9th Edition, 2010.
Web Resource(s):
https://nptel.ac.in

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Solve integrals involving quadratic and trigonometric expressions using standard integration techniques.	K1,K2, K3
CO2	Apply properties of definite integrals and reduction formulae to evaluate complex integrals effectively.	K2, K3, K4
CO3	Evaluate double and triple integrals and apply them to calculate areas and volumes.	K2, K3, K4, K5
CO4	Analyse and perform change of order of integration and coordinate transformations in multiple integrals.	K3, K4, K5
CO5	Understand, derive, and apply Beta and Gamma functions in solving integrals and related problems.	K1,K2, K3, K4

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	1	2	2	3	2	1	3	2	1	1	2	**1.92**
CO2	3	1	2	3	3	2	1	3	2	1	1	2	**2**
CO3	3	1	1	3	3	3	1	3	2	1	2	3	**2.17**
CO4	2	1	2	3	3	3	1	3	3	2	3	3	**2.42**
CO5	3	1	2	3	2	3	1	3	2	1	2	2	**2.08**
Mean Overall Score													2.12
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	25BMA22	Core – IV	5	5	25	75	100
Course Title	**Analytical Geometry (2D & 3D)**						

Learning Objectives	
LO1	To understand and apply the concept of homogeneous equations of second degree to represent straight lines indifferent forms.
LO2	To derive polar equations for straight lines, circles, and conic sections, and analyze their geometric properties.
LO3	To formulate general equations of planes, calculate angles between two planes, and determine perpendicular distances.
LO4	To calculate the angle between a line and a plane, determine the length of perpendiculars, and analyze coplanar and skew lines.
LO5	To originate equations of spheres, determine lengths of tangents, and analyze sections of spheres.

SYLLABUS

Unit	Contents	Hours
I	**Unit -I: Pair of Straight lines** Introduction – Homogeneous equation of second degree – Angle between the lines – Equation for the bisector of the angle between the lines – Condition for a second degree equation to represent a pair of straight lines. (Chapter 3:Sections 1 to 6, pages: 68 to 91).	**15**
II	**Unit-II: Polar Coordinates** Introduction –Definition of polar coordinates – Relation between Cartesian coordinates and Polar coordinates – polar equation of a straight line – circle – Polar equation of a conic. (Chapter 9: Sections:1 to 7, 9 and 10, Pages:325 to 330 and 333 to 344).	**15**
III	**Unit –III: Plane** Introduction–General equations of plane–Angle between two planes – Perpendicular distance – Plane passing through: Three given points, Intersection of two given planes – Condition for a second degree equation to represent a pair of planes. (Chapter 2 Full, Pages: 24 -45).	**15**
IV	**Unit-IV: Straight Lines** Introduction – Equations of straight Lines – Angle between a line and plane – Length of the perpendicular – Coplanar lines – Skew lines – Intersection of three planes. (Chapter 3: Sections:1 to 8, Pages:46 to 75)**.**	**15**
V	**Unit -V:Sphere** Equations of sphere – Length of the tangent – Section of a sphere – Equation of circle – Intersection of two spheres – Condition for the orthogonality – Radical planes. (Chapter 4 Full, Pages: 92 to 114)**.**	**15**

Recommended Textbook(s):

1. T. K. Manicavachagom Pillay & T. Natarajan, A text book of Analytical Geometry Part I - Two dimensions, S. Viswanathan (printers &publication) PvtLtd.
2. T. K. Manicavachagom Pillay & T. Natarajan, A text book of Analytical Geometry Part II - Three

dimensions, S. Viswanathan (printers&publication)PvtLtd.

Reference Book(s):

1. P. Duraipandian and Laxmi Duraipandian, Analytical Geometry Two dimensions, Emerald Publication.
2. Shanti Narayan and P.K.Mittal, Analytical Solid Geometry of 3D, S. Chand Publications.
3. P.R.Vittal, Analytical Geometry 2D and 3D, Pearson Publications, Chennai.

Web Resource(s):

https://mathworld.wolfram.com/,
http://www.univie.ac.at/future.media/moe/galarie.html/

Course Outcomes

Upon successful completion of this course, the student will be able to:

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Analyze and apply homogeneous second-degree equations to represent a pair of straight lines, and compute angles and bisectors between lines.	K3, K4
CO2	Convert Cartesian equations to polar form and derive polar equations of straight lines, circles, and conics with geometric interpretation.	K2, K3
CO3	Formulate and solve problems involving planes, including finding angles between planes and computing perpendicular distances.	K3, K4
CO4	Evaluate the relationships between lines and planes, including angle of intersection, perpendicular distances, and conditions for coplanarity and skewness.	K4, K5
CO5	Apply geometric and algebraic methods to solve problems involving spheres, including tangents, intersections, orthogonality, and radical planes.	K3, K4

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	1	2	3	3	2	1	3	2	1	1	2	**2**
CO2	3	1	2	2	2	2	1	3	2	1	2	2	**1.92**
CO3	3	1	2	3	3	2	1	3	2	1	2	3	**2.17**
CO4	3	1	2	3	3	3	1	3	3	2	3	3	**2.5**
CO5	3	1	2	3	3	3	1	3	2	1	2	3	**2.25**
Mean Overall Score													2.17
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	25BEMA23A	Elective – II	4	3	25	75	100
Course Title	**Numerical Methods – II**						

Learning Objectives	
LO1	Understand the concepts of numerical differentiation and apply finite difference operators to obtain derivatives and solve maxima-minima problems.
LO2	Familiarize with numerical integration techniques to evaluate definite integrals using Trapezoidal, Simpson's, and Weddle's rules.
LO3	Gain knowledge of solving linear difference equations with constant coefficients and derive particular integrals for standard functions.
LO4	Learn to solve first-order ordinary differential equations using Taylor's and Picard's iterative methods.
LO5	Develop competency in applying Euler's, modified Euler's, improved Euler's, and Runge-Kutta methods for solving ordinary differential equations numerically.

SYLLABUS

Unit	Contents	Hours
I	**Unit I: Numerical Differentiation** Derivatives using Newton's Forward and Backward Difference Formulae Derivatives using Stirling's Formula - Derivatives using Divided Difference Formula - Maxima and Minima using the above Formulae. **Chapter7**:Section7.1to7.4&7.6	**12**
II	**Unit II: Numerical Integration** Trapezoidal Rule-Simpson's One-Third Rule - Simpson's Three-Eighth Rule - Weddle's Rule – Applications. **Chapter7**:Section7.9&7.13to7.15	**12**
III	**Unit III: Difference Equations** Linear Homogenous and Non Homogenous Difference Equation with constant coefficients-particular integrals for $a^x, x^m, \sin kx, \cos kx, a^x F(x)$. **Chapter8**:Section8.1to8.4&8.6	**12**
IV	**Unit IV: Numerical solution of Ordinary Differential Equations (I order only):** Taylor's series method- Picard's method. **Chapter9:**Section9.5,9.6	**12**
V	**Unit V: Numerical solution of Ordinary Differential Equations (I order only):** Euler's Method- Modified Euler's Method – Improved Euler's Method –Runge - Kutta Method (Fourth Order only). **Chapter9:**Section9.7,9.9to9.11	**12**

Recommended Textbook(s):

P. Kandasamy, K. Thilagavathy(2003) Calculus of Finite differences & Numerical Analysis, S. Chand & Company Ltd., New Delhi-55.

Reference Book(s):

1.B.D. Gupta.(2001)*Numerical Analysis.* Konark Pub.Ltd.,Delhi

5. M.K. Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.
6. S. Arumugam. (2003) *Numerical Methods*, New Gamma Publishing, Palayamkottai.
7. H.C.Saxena.(1991)*Finite differences and Numerical analysis,* S.Chand&Co.,Delhi

Web Resource(s):

Https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/
Https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Compute derivatives and solve maxima-minima problems using Newton's forward, backward, Stirling's, and divided difference formulae.	K3, K4
CO2	Apply numerical integration techniques such as Trapezoidal, Simpson's, and Weddle's rules to evaluate definite integrals.	K3
CO3	Formulate and solve linear homogeneous and non-homogeneous difference equations with constant coefficients for given standard functions.	K3, K4
CO4	Solve first-order ordinary differential equations using Taylor's series method and Picard's iterative method.	K3, K4
CO5	Employ Euler's, modified Euler's, improved Euler's, and Runge-Kutta methods to obtain numerical solutions of first-order ordinary differential equations.	K3, K4

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	1	2	3	3	2	1	3	2	1	1	2	**2**
CO2	3	1	2	3	3	2	1	3	2	1	2	2	**2.08**
CO3	3	1	2	3	3	2	1	3	3	1	2	3	**2.25**
CO4	3	1	2	3	2	2	1	3	2	1	2	2	**2**
CO5	3	1	2	3	3	3	1	3	2	1	2	3	**2.25**
Mean Overall Score													2.12
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	25BEMA23B	Elective – II	4	3	25	75	100
Course Title	**INDUSTRIAL MATHEMATICS**						

Learning Objectives	
LO1	To understand and apply least squares techniques for fitting various types of curves to empirical data.
LO2	To explain index numbers, their types, and calculate cost of living indices effectively.
LO3	To formulate linear programming problems and solve them using graphical methods.
LO4	To analyse and design basic control systems using mathematical models and feedback mechanisms.
LO5	To develop interdisciplinary project skills by collaborating with professionals from diverse fields.

SYLLABUS		
Unit	Contents	Hours
I	**Unit I - Curve Fitting** Fitting curves of the form $y = ax + b$, $y = ax^2 + bx + c$, $y = ax^b$, $y = ab^x$, $y = ae^{bx}$ to data using least squares techniques .	**12**
II	**Unit II - Index numbers:** Defintion – weighted and unweighted indices –cost of living index – fixed base and change of base indices.	**12**
III	**Unit III -Linear Programming:** Formulating linear programming problems and solving linear programming problems with two unknowns using graphical method.	**12**
IV	**Unit IV - Control Theory:** Designing control systems for industrial processes using mathematical models and feedback mechanisms.	**12**
V	**Unit V – Project preparation-Interdisciplinary Approach:** students to work on interdisciplinary projects, collaborating with engineers, scientists, and other professionals.	**12**

Recommended Textbook(s):
Industrial Mathematics by N. Balakrishnan, G. Shanmugam, G. Saravanaraj
Reference Book(s):
1.Numerical Methods – K. Sankara Rao 2.Fundamentals of Mathematical Statistics – Gupta & Kapoor 3.Operations Research – Kanti Swarup et al. 4. Control Systems Engineering – Nagrath & Gopal

Web Resource(s):
https://nptel.ac.in

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Fit linear, polynomial, exponential, and power curves to data sets using the method of least squares.	K2, K3, K4
CO2	Calculate and interpret weighted and unweighted index numbers including cost of living indices with change of base.	K2, K3, K4
CO3	Formulate and solve linear programming problems with two variables using the graphical method.	K2, K3, K4
CO4	Design and analyse control systems for industrial processes applying mathematical and feedback models.	K3, K4, K5
CO5	Develop and present interdisciplinary projects integrating mathematical techniques with other domains.	K3, K5, K6

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	2	2	3	2	3	1	3	2	1	2	2	**2.17**
CO2	3	2	2	2	2	2	2	3	2	2	2	2	**2.17**
CO3	3	2	3	3	3	3	2	3	3	2	2	3	**2.67**
CO4	3	3	3	3	3	3	2	3	3	2	3	3	**2.83**
CO5	3	3	3	2	3	3	3	3	3	3	3	3	**2.92**
Mean Overall Score													2.55
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	25BSMA24	Skill Enhancement Course – II (SEC-II)	2	2	25	75	100
Course Title	**Mathematics For Competitive Examinations -II**						

Learning Objectives	
LO1	Understand fundamental arithmetic concepts including time, work, distance, and mixtures.
LO2	Apply knowledge of simple and compound interest to solve related financial problems.
LO3	Analyse problems related to calendars and clocks for competitive reasoning.
LO4	Interpret and analyse data using various graphical representations such as bar graphs, pie charts, and line graphs.
LO5	Develop reasoning skills to solve non-verbal and analytical reasoning problems efficiently.

SYLLABUS

Unit	Contents	Hours
I	**Unit I: Arithmetic Ability** Time and Work, Time and Distance, Boats and Streams, Problems on Trains Section I: 17 to 20	**06**
II	**Unit II : Arithmetic Ability (continued)** Alligation or Mixture, Simple Interest, Compound Interest Section I: 21 to 23	**06**
III	**Unit III: Arithmetic Ability (continued)** Calendar , Clocks Section I : 27, 28	**06**
IV	**Unit IV : Data Interpretation** Tabulation, Bar Graphs, Pie Chart, Line Graphs Section II: 36 to 39	**06**
V	**Unit V: Reasoning** Non-Verbal Reasoning– Analytical Reasoning– Grouping of Identical Figures. (Book 2, Section: III, Chapter 3, 4, 13)	**06**

Recommended Textbook(s):

1. R. S. Agarwal, *Quantitative Aptitude for Competitive Examinations*, Revised Edition, S. Chand and Company Ltd., Ram Nagar, New Delhi, Reprint2022.
2. R. S. Agarwal, A Modern Approach To Verbal And Nonverbal Reasoning ,S .Chand,2018.

Reference Book(s):

V. V. K. Subbiraj, *Test of Reasoning –Verbal/Non-Verbal & General Intelligence for Competitive Examinations*, Sura Books,2007

Web Resource(s):

https://nptel.ac.in

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Solve problems on time and work, time and distance, boats, streams, and trains using logical mathematical concepts.	K3
CO2	Calculate solutions for mixture, simple interest, and compound interest problems with accuracy.	K3
CO3	Analyse and solve questions based on calendars and clocks effectively.	K4
CO4	Interpret data from tables, bar graphs, pie charts, and line graphs for decision-making in quantitative aptitude.	K4
CO5	Evaluate and solve non-verbal reasoning and analytical reasoning problems to enhance competitive examination performance.	K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	2	3	3	3	2	2	3	3	2	2	3	**2.58**
CO2	3	2	2	2	3	2	1	3	2	1	1	2	**2**
CO3	3	1	2	2	2	2	1	3	2	1	1	2	**1.83**
CO4	3	3	3	3	3	3	2	3	3	2	2	3	**2.75**
CO5	3	3	3	3	3	2	2	3	3	3	2	3	**2.75**
Mean Overall Score													2.40
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	25BSMA25	Skill Enhancement Course – III (SEC - III)	2	2	25	75	100
Course Title	**OFFICE AUTOMATION**						

Learning Objectives	
LO1	To introduce the basic concepts of computer systems, input-output devices, operating systems, and programming languages.
LO2	To develop skills in creating, formatting, and managing word documents for academic and professional use.
LO3	To apply spreadsheet tools for data entry, computation using formulas, chart preparation, and financial statement creation.
LO4	To explain the concepts of database management systems and perform data handling, queries, and reporting using MS Access.
LO5	To create effective presentations using PowerPoint with advanced features like animations, transitions, and multimedia insertion.

SYLLABUS

Unit	Contents	Hours
I	**Unit I: Introductory concepts** Memory unit– CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: LINUX–Windows. Introduction to Programming Languages. (Chapter 1)	**06**
II	**Unit II: Word Processing** Open, Save and Close word document; Editing text–tools, formatting, bullets; Spell Checker-Document formatting–Paragraph alignment, indentation, headers and footers, numbering; printing–Preview, options, merge. (Chapter 2)	**06**
III	**Unit III: Spreadsheets** Excel– opening, entering text and data, formatting, navigating; Formulas–entering, handling and copying; Charts– creating, formatting and printing, analysis tables, preparation of financial statements, Introduction to data analytics. (Chapter 3)	**06**
IV	**Unit IV: Database Concepts** The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports (MS–Access). (Chapter 4)	**06**
V	**Unit V: Power point** Introduction to Power point - Features –Understanding slide typecasting &viewing slides – creating slide shows. Applying special object–including objects & pictures–Slide transition–Animation effects, audio inclusion, timers. (Chapter 5)	**06**

Recommended Textbook(s):

1. P. RizwanAhmed, Office Automation, Margham Publications,2015

Reference Book(s):

1. Peter Norton, "Introduction to Computers"–Tata Mc Graw-Hill.
2. Jennifer Ackerman Kettel, GuyHat-Davis, Curt Simmons,"Microsoft2003",Tata Mc Graw Hill.

Web Resource(s):
1. https://www.udemy.com/course/office-automation-certificate-course/ 2. https://www.javatpoint.com/automation-tools

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Identify and explain the functions of computer hardware, operating systems, and programming languages.	K1, K2
CO2	Create, format, and edit documents using word processing software with advanced formatting features.	K2, K3
CO3	Develop spreadsheets using formulas, charts, and perform basic financial and data analytics tasks.	K2, K3, K4
CO4	Design and manage simple databases, perform sorting, indexing, queries, and generate reports using MS Access.	K2, K3, K4
CO5	Create professional presentations incorporating multimedia, animations, transitions, and custom layouts.	K2, K3, K4

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	2	2	3	2	2	2	2	**2.17**
CO2	2	3	2	2	2	3	2	2	2	2	2	2	**2.17**
CO3	3	2	3	3	3	3	2	3	3	2	3	3	**2.75**
CO4	3	2	3	3	3	3	2	3	3	2	3	3	**2.75**
CO5	2	3	2	2	2	3	2	2	2	2	2	2	**2.17**
Mean Overall Score													2.40
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High